Notes on the Subapterous Female of Tipula simplex Doane.

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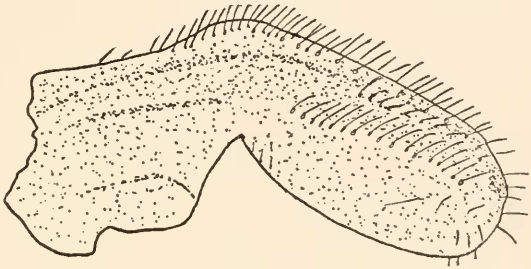
Early in March, 1906, while collecting in a meadow near Stanford University, I found thousands of Tipulids half flying, half running over the grass. Many were collected, and all proved to be male specimens of *Tipula simplex* Doane. Although it is not uncommon to find the males of several species of *Tipula* issuing somewhat earlier than the females, the very great abundance and the peculiar actions of this species, running frantically over the grass, rarely flying and then not rising more than a few inches, caused me to make



Rudimentary wing of female *Tipula simplex* Doane.

a particularly close search for the females, but none were found at the time. Two days later, in another place where the males were again abundant, a few females were found crawling slowly over the ground in the thick grass, sometimes crawling up on the grass. They were, as the action of the males had led me to expect, unable to fly. The wings were short and rudimentary, being about as long as the halteres, distorted in shape, entirely veinless and with rows of rather long, stiff hairs along the costal margin in the anterior distal portion. The accompanying figure will give some idea of the shape of the wings and the arrangement of the hairs. In other respects the female is similar to the male, except that the legs are much shorter and stouter. The ovipositor is reddish-brown, the upper valves rather wide at the base, tapering to a sharp point and curving slightly outward at the tip. The lower

valves are broader and blunter and do not reach the tip of the upper valves.

As the early part of March was stormy, but little collecting was done, and only eighteen females were taken. Two pairs were taken mating, and one female was seen with her ovipositor thrust into the ground, evidently depositing her eggs, but no eggs were found. A few pupæ, but no larvæ were found.

We have, of course, a number of apterous or subapterous forms throughout the Diptera, the two conditions being, indeed, found in the Tipulidæ. The genus *Chionea* being entirely wingless, and the species recently described by Cuquillett, (Can. Ent., Vol. XXXVII, p. 347), assigned provisionally to the genus *Limnophila,* in which both the male and the female have abortive wings.

It is difficult to conceive what combination of forces or tendencies have been at work to bring about this particular anomalous condition. We can easily see why it would be advantageous for the parasitic forms living among the hairs or feathers of their host to be wingless. We also think we can see the advantage the wingless or short-winged forms have over the winged forms in regions where the latter are more or less apt to be carried to their destruction by the winds. Thus it is assumed that *Calycoptera moseleyi* Eaton and others on the Kerguelen Islands have gradually lost their wings through a process of natural selection, and we can conceive that the snow-loving *Chionea* and the subapterous alpine *Limnophila aspidoptera* possess an advantage over flying forms living under similar conditions. But none of these explanations have any force in the present instance. The fact that practically all of the Tipulids are winged and are able to fly considerable distances is certainly good evidence that the winged forms are well fitted to their environment. But here we have living under exactly the same conditions as to time, place, temperature, etc.; this wingless form, which, if numbers count for anything, is certainly a successful form. It seems that some explanation other than that of natural selection will have to be looked for if we are going to "explain" such cases.